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S2 EP10: A Trip to Martian Moons

Moons of Mars

EPISODE 10



ASTROPHYSICS: DEEP IN THE SPACE
WITH MAANVINDER PILANIA

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A Trip to Martian Moons

Hello and welcome back to the podcast! In today's episode, we're going to take an exciting trip to Mars—but not to the red planet itself. We're heading to Mars' moons, Phobos and Deimos. These two tiny moons are just as fascinating as Mars itself, and they're full of mysteries waiting to be explored. So, let's buckle up for a trip to Mars' moons!

A Quick Introduction to Mars and Its Moons

Before we get into the details of Phobos and Deimos, let's talk about Mars itself. As you probably know, Mars is the fourth planet from the Sun and is often called the "Red Planet" because of its reddish appearance, caused by iron oxide, or rust, on its surface. But what's less known is that Mars has two small moons orbiting it—Phobos and Deimos. These moons are much smaller than our own Moon, and their shapes are irregular, almost like asteroids. In fact, they're thought to be captured asteroids from the asteroid belt between Mars and Jupiter. So, let's start by talking about Phobos, the larger of Mars' two moons.

Phobos: The Larger Moon

Phobos is the larger and closer of the two moons. It's about 22 kilometers (or 13.6 miles) in diameter, which is tiny compared to our Moon, which is about 3,474 kilometers (2,159 miles) wide. Phobos orbits Mars so closely—only about 6,000 kilometers (or 3,700 miles) above the Martian surface—that it's actually moving closer to Mars every year. In fact, Phobos is gradually spiraling in toward Mars, and in about 50 million years, it's expected to either crash into Mars or break apart and form a ring around the planet. Pretty wild, right? One of the most interesting features of Phobos is its strange surface. It's covered with craters, and the largest one, called Stickney Crater, is about 9 kilometers (5.6 miles) across—almost half the size of the moon itself! Phobos' surface also has grooves and ridges that make it look like it's been stretched or pulled by Mars' gravity over time. It's almost as if this moon is slowly being torn apart by the planet's powerful gravitational pull.

Deimos: The Smaller Moon

Now, let's move on to Deimos, the smaller and more distant of the two moons. Deimos is only about 12 kilometers (7.5 miles) in diameter, making it even smaller than Phobos. It orbits much farther from Mars—about 23,460 kilometers (14,580 miles) away—about six times farther than Phobos. Unlike Phobos, Deimos moves slowly away from Mars over time. Deimos has a much smoother surface than Phobos. It doesn't have the deep craters that Phobos does, but it's still covered with smaller ones. It's thought that Deimos is made mostly of rock and ice, with its surface coated in a layer of fine dust. Because it's so far from Mars and its gravity isn't as strong, Deimos doesn't experience the same stretching and pulling forces that Phobos does. Instead, it's just quietly orbiting around Mars, with no big dramatic changes.

How Did Phobos and Deimos Form?

One of the biggest questions scientists have about Phobos and Deimos is how they came to be. Since they are much smaller than Earth's Moon and have irregular shapes, scientists think they may have been captured by Mars' gravity. They could have been asteroids floating around the

solar system, and Mars' gravity pulled them in, trapping them in orbit around the planet. This theory is supported by the fact that both moons are made of similar materials to objects found in the asteroid belt. However, there's another theory that suggests that Phobos and Deimos may have formed from debris left behind by a huge impact on Mars. The impact could have blasted material into space, which then came together to form these moons. Although scientists don't have a definite answer yet, both theories are still being studied.

Could We Visit Mars' Moons?

You might be wondering if humans could ever visit Phobos or Deimos. Well, while they're both much smaller than Earth's Moon, they do present some unique challenges for space travel. For one, gravity on both moons is so weak that astronauts would have a hard time walking around. If you tried to jump on Phobos, you could leap really high—like, really high! In fact, you'd probably just float off the surface and have to be tethered down. However, Phobos and Deimos both make for excellent places to study Mars from a different perspective. Phobos, in particular, would be an ideal spot for a space station. Since it orbits Mars so closely, it could be a great platform for launching missions to the Martian surface. It could also serve as a pit stop for future Mars explorers. In addition, Phobos and Deimos could provide valuable resources for space missions. For example, they might have water ice beneath their surfaces, which could be used for drinking water, oxygen, or even rocket fuel. Scientists are still researching whether these moons contain resources that could make them useful for future Mars missions.

Why Are Mars' Moons Important?

Studying Phobos and Deimos is important for several reasons. First, understanding their origin and composition can help scientists learn more about the early solar system. By studying these moons, we can get clues about how the planets and their moons formed billions of years ago. Second, Phobos and Deimos might play a role in future missions to Mars. As we plan to send astronauts to the Red Planet, having a base on one of these moons could help reduce the cost and complexity of reaching Mars.

So, there you have it—a quick trip to Mars and its two fascinating moons, Phobos and Deimos. These tiny, mysterious worlds have a lot to teach us about our solar system's history and the future of space exploration. Whether it's studying their strange surfaces, understanding their origins, or planning future missions, Mars' moons will continue to be an important part of space science for years to come. Thanks for joining me on today's adventure! I hope you enjoyed learning about the Martian moons, and who knows—maybe one day, we'll all be taking a trip there ourselves. See you in the next and final episode of this season!

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